

NASA SBIR/STTR Technologies

H10.02-9608 - Universal Orbital Material Processing Module



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Identification and Significance of Innovation

To meet NASA need for sustainable space operations and full utilization of the International Space Station (ISS), Physical Optics Corporation proposes to develop a novel Universal Orbital Material Processing Module (UniMatPro). The proposed module offers production of high quality, low loss (losses reduced by >10x) optical fibers in zero gravity. Preliminary effort will focus on ZBLAN optical fiber which has implications in lasers and optical transmission of wavelengths ranging from ultraviolet (UV) through mid-wave infrared (MWIR); this showcases the utilization of the ISS in high-value manufacturing.

Estimated TRL at beginning and end of contract: (Begin: 4 End: 5)

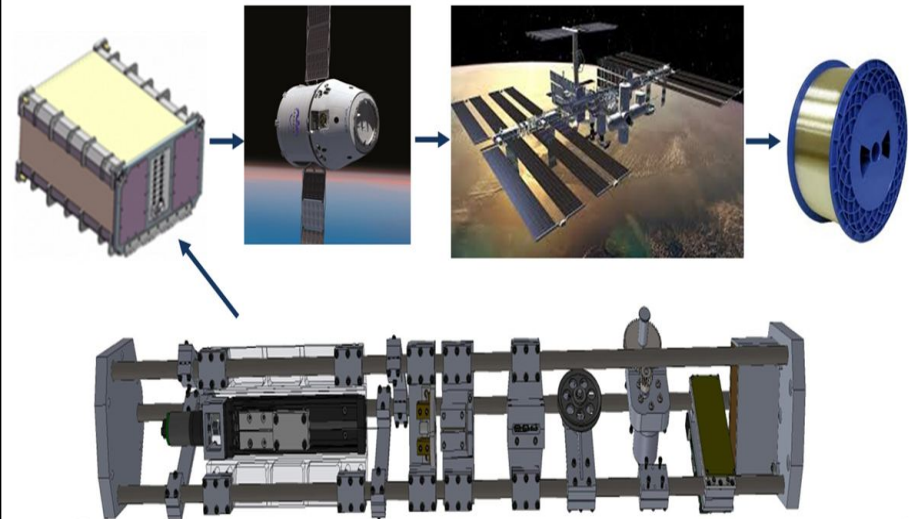
Technical Objectives and Work Plan

Phase I Technical Objectives

- Objective 1. Mission planning and requirements review.
- Objective 2. Material safety and structural integrity compliance analysis.
- Objective 3. UniMatPro design completion and feasibility demonstration.
- Objective 4. Preliminary establishment of the commercial potential.

Phase I Work Plan

- Task 1. Develop the Mission Plan for UniMatPro Module
- Task 2. Define Design Specifications Based on Analysis of Available Commercial Vendors for ISS Mission Implementation
- Task 3. Complete Preliminary Safety and Structural Integrity Review for UniMatPro Module
- Task 4. Develop the UniMatPro Module Design
- Task 5. Assemble and Test the UniMatPro Phase I Prototype
- Task 6. Explore the Commercial Potential and Product Viability
- Task 7. Prepare and Submit Reports



NASA Applications

- Production of low transmission loss ZBLAN optical fibers in zero gravity for applications in:
- Optical transmission from UV through MWIR for hyperspectral orbital imaging systems
 - Pigtailling of quantum cascade lasers (for remote environmental sensing)

Non-NASA Applications

- Production of other fluoride and chalcogenide optical fibers for material processing, medical, and military applications
- Blue and MWIR fiber lasers based on doped ZBLAN fibers for industrial and military customers

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NON-PROPRIETARY DATA